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10/553,977	10/20/2005	Koji Yano	03500.018289.	8243

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EXAMINER	
KILPATRICK, BRYAN T	
ART UNIT	PAPER NUMBER
1797	
MAIL DATE	DELIVERY MODE
09/14/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,977	YANO ET AL.	
	Examiner	Art Unit	
	BRYAN T. KILPATRICK	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) *4 and 13-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12,32 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The supplemental amendments and arguments filed on 07 September 2010 have been entered and fully considered.

2. Instant claim 1 has been amended by Applicant's amendment.

3. Instant claims 1-3, 5-12, and 32-33 are pending currently.

4. In light of Applicant's amendment to the instant specification, the objection disclosure has been withdrawn.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 February 2010 has been entered.

Election/Restrictions

Applicant's election **with traverse** of **Group I, claim 1-12** in the reply filed on 05 March 2009 is acknowledged. The traversal is on the ground(s) that "there would not be undue burden in examining the three groups of claims in a single application." This is not found persuasive because the technical feature, a substance detection device having an electromagnetic wave-projecting means and a detecting means, is recited in U.S. Patent 3,947,123 (CARLSON et al.) in claims 7-15. The technical feature recited in the instant claims can not be considered a "special technical feature" under PCT Rule 13.2 since the feature is not "a contribution which each of the claimed inventions, considered as a whole, makes over the prior art." (MPEP Appendix T – Patent Cooperation Treaty, Rule 13: Unity of Invention)

The requirement is still deemed proper and is therefore made FINAL.

Claims 13-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 05 March 2009.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5, 7-12, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication 2002/0191884 A1 (LETANT et al.), and further in view of U.S. Patent 5,550,635 (Saitoh et al.).

Instant claim 1 recites a device for detecting a target substance in a fluid, comprising a periodic structure having a vacant portion for passing a fluid containing the target substance and a solid portion capable of transmitting an electromagnetic wave arranged regularly to form a periodic distribution of a refractive index for the electromagnetic wave, an electromagnetic wave-projecting means for projecting the electromagnetic wave to the periodic structure, and a detecting means for measuring the wave emitted from the periodic structure to detect a change in the periodic distribution of the refractive index. Instant claim 1 further recites that the quantity of the target substance is calculated based on the change in position with respect to the wave emitted from periodic structure. Instant claim 2 recites wherein a trapping substance capable of bonding selectively to the target substance is disposed on the surface of the solid portion, and a change in the periodic distribution of the refractive index caused by bonding the target substance to the trapping substance is detected. Figures 5-6 and paragraphs [0005]-[0011] of LETANT et al. disclose a device and method both having: photonic waveguide filters with a plurality of pores patterned leading to a photonic band gap; chemical or biological target specific anchors attached to the walls of the pores; a waveguide system comprised of a light source, at least one silicon waveguide filter as previously stated, and a detector and a computer for data analysis were transmitted photons are counted and transmitted light is observed. LETANT et al. discloses

analysis and calculation conducted before and after the addition of a binding material in order to detect the presence of a bound material via a change in a transmission signal used for analysis (paragraphs [0051]-[0053]); furthermore, LETANT et al. expressly discloses observing changes in a refractive index in paragraph [0053], which is known in the art to change when light travels between different media. LETANT et al. further discloses employing a computer to calculate the concentration of bound targets via the intensity of the light transmitted through the photonic filter versus wavelength (paragraph [0049]).

LETANT et al. does not disclose the use of a two-division detector. However, Saitoh et al. discloses the use of a two-division sensor used with a calculation system (Fig. 6, and col. 11, lines 34-41). Since Saitoh et al. expressly that the two-division sensor is employed as a detector for a deviation detecting system that detects deviation on objects having a periodicity (Abstract), it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the two-division sensor of Saitoh et al. as the detector of LETANT et al. since LETANT et al. expressly discloses observing a change in refractive index (paragraph [0053]) because it scales with a filling fraction of a pore by a target being analyzed. The motivation would have been to provide an accurate way of adjusting pore sizes to target sizes (paragraph [0053] of LETANT et al.).

Instant claim 3 recites the periodic structure forbids transmission of the electromagnetic wave in a specific wavelength band depending on the periodic

distribution of the refractive index. Paragraph [0005] discloses the use of at least one silicon wafer having a plurality of through pores distributed according to a designed pattern leading to a photonic band gap, which is designed to act as the photonic crystals built to present a periodic variation of refractive index that is controlled by changing the periodicity and introducing point or line defects in the photonic crystal (paragraph [0003]).

Instant claim 5 recites the periodic structure has a defect in the regular arrangement of the vacant portion and the solid portion to provide an electromagnetic wave-transmissive wavelength range in the wavelength band where the electromagnetic wave propagation is forbidden, the electromagnetic wave-projecting means projects the electromagnetic wave in the electromagnetic wave-transmissive wavelength range to the periodic structure, and the detecting means measures the electromagnetic wave of the electromagnetic wave-transmissive wavelength range emitted from the periodic structure. Paragraph [0051] discloses the introduction of defects in the waveguide to increase sensitivity of a particular wavelength as compared to others.

Instant claim 7 recites the device has additionally a polarization controlling means for controlling polarization of the electromagnetic wave. Paragraph [0003] disclose the controlling the propagation of electromagnetic waves by changing the periodicity and introducing point or line defects in the photonic crystal.

Instant claim 8 recites the electromagnetic wave projected to the periodic structure has a continuous wavelength component, and the detecting means measures the spectrum of the electromagnetic wave emitted from the periodic structure. Instant

claim 9 recites the electromagnetic wave is projected through a collimating means onto the periodic structure, and the detecting means measures the direction of transmission of the electromagnetic wave. Paragraph [0049] and Figure 6 disclose light from a source being directed via a fiber optic and a lens, which is then detected by a detector after passing through the waveguide component.

Instant claim I0 recites the device has additionally a first aligning means for aligning the electromagnetic wave emitted from the electromagnetic wave-projecting means to enter the periodic structure at a prescribed position at a prescribed angle, and a second aligning means for aligning the electromagnetic wave to reach the detecting means. Paragraph [0049] and Figure 6 disclose light from a source being directed via a fiber optic and a lens, and a microscope objective to focus the light produced from analysis into a detector.

Instant claim 11 recites that solid portions of the structure are columnar, and the vacant portion is an interstice among the structure. Instant claim 33 recites the use of circular structures as part of an emission face. Paragraph [0022] of LETANT et al. discloses the use of cylinders for perfect crystals and for crystals with defects as part of an investigation of electromagnetic wave propagation conducted by a disclosed reference. It is known that cylindrical shapes have circular components.

Instant claim 12 recites the solid portion is a continuous body and the vacant portion is constituted of holes penetrating the continuous body. Paragraph [0005] and Figures 1A-1B disclose the use of a silicon filter having pores.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over LETANT et al. and Saitoh et al. as applied to claim 1 above, and further in view of U.S. Patent 3,973,118 (LaMONTAGNE).

Instant claim 6, which is dependent on previously rejected instant claim 1 - see rejection above, recites the device has additionally a temperature controlling means for controlling the temperature of the periodic structure. LETANT et al. discloses a device and method both having: photonic waveguide filters with a plurality of pores patterned leading to a photonic hand gap; chemical or biological target specific anchors attached to the walls of the pores; a waveguide system comprised of a light source, at least one silicon waveguide filter as previously stated, a detector, and a computer for data analysis (Figures 5-6 and paragraphs [0005]-[0011]).

LETANT et al. does not disclose the use of a two-division detector. However, Saitoh et al. discloses the use of a two-division sensor used with a calculation system (Fig. 6, and col. 11, lines 34-41). Since Saitoh et al. expressly that the two-division sensor is employed as a detector for a deviation detecting system that detects deviation on objects having a periodicity (Abstract), it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the two-division sensor of Saitoh et al. as the detector of LETANT et al. since LETANT et al. expressly discloses observing a change in refractive index (paragraph [0053]) because it scales with a filling fraction of a pore by a target being analyzed. The motivation would have been to

provide an accurate way of adjusting pore sizes to target sizes (paragraph [0053] of LETANT et al.).

Neither LETANT et al. nor Saitoh et al. expressly discloses a temperature controlling means. However, LaMONTAGNE discloses an electro-optical device that can be used as a thermal detector by analyzing electromagnetic radiant output in lines 39-42 of column 2. It is important, in such a thermal detector, to maintain a base line temperature to use as a comparison, measuring any fluctuations therefrom as representing an environmental change. It would have been obvious to one of ordinary skill in the art to control the temperature of the device of LETANT et al. and Saitoh et al. given the teachings of LaMONTAGNE to employ the photo-electric detector as thermal detector since LaMONTAGNE teaches that such a device is designed to detect different electromagnetic energy wavelengths simultaneously and nearly instantaneously (LaMONTAGNE; lines 46-50, column 1).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over LETANT et al. and Saitoh et al. as applied to claim 1 above, and further in view of U.S. Patent 5,712,840 (MATSUMURA et al.).

Instant claim 32, which is dependent on previously rejected instant claim 1 - see rejection above, recites the use of a two-division sensor. LETANT et al. discloses a device and method both having: photonic waveguide filters with a plurality of pores patterned leading to a photonic hand gap; chemical or biological target specific anchors

attached to the walls of the pores; a waveguide system comprised of a light source, at least one silicon waveguide filter as previously stated, a detector, and a computer for data analysis (Figures 5-6 and paragraphs [0005]-[0011]).

LETANT et al. does not disclose the use of a two-division detector. However, Saitoh et al. discloses the use of a two-division sensor used with a calculation system (Fig. 6, and col. 11, lines 34-41). Since Saitoh et al. expressly that the two-division sensor is employed as a detector for a deviation detecting system that detects deviation on objects having a periodicity (Abstract), it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the two-division sensor of Saitoh et al. as the detector of LETANT et al. since LETANT et al. expressly discloses observing a change in refractive index (paragraph [0053]) because it scales with a filling fraction of a pore by a target being analyzed. The motivation would have been to provide an accurate way of adjusting pore sizes to target sizes (paragraph [0053] of LETANT et al.).

Neither LETANT et al. nor Saitoh et al. expressly discloses the use of a two-division sensor. However, MATSUMURA et al. discloses the use of a two-division sensor as part of an optical information recording/reproducing apparatus in the Abstract. Since all devices pertain to the field of optical analysis, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the use of a two-division sensor of MATSUMURA et al. with the device of LETANT et al. and Saitoh et al. for the purpose of eliminating crosstalks and jitters, and ensuring reproduction with high reliability (Abstract of MATSUMURA et al.).

Response to Arguments

Applicant's arguments with respect to claim 1 has been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. J.P. 08-152430 A (Yasutake et al.) discloses the use of a two-division detector as part of a light scattering optical system in an optical microscope (English-translated Abstract).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN T. KILPATRICK whose telephone number is (571)270-5553. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. T. K./
Examiner, Art Unit 1797

/SAM SIEFKE/
Primary Examiner, Art Unit 1797